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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/732,966	12/10/2003	Hung Chih Chen	8402 USA/AGS/LAP	9309

7590 11/17/2005

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EXAMINER
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MACARTHUR, SYLVIA

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 11/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/732,966

Applicant(s)

CHEN ET AL.

Examiner

Sylvia R. MacArthur

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/29/2005;12/10/03.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-8, 13, 18, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Kajiwara et al (WO 02/098608).

Kajiwara et al teaches a CMP appartua having a retaining ring with a contoured surface.

Regarding claim 1: Kajiwara teaches a generally annular body (170) having a top surface, a bottom surface, an inner diameter surface, and an outer diameter surface, wherein the bottom surface includes a plurality of channels (215), each channel extending from the inner diameter surface to the outer diameter surface and having a rounded ceiling see Figs. 11B and 12.

Regarding claim 2: The retaining ring of claim 1, wherein the rounded ceiling has a semi-circular cross-section see Figs. 11B and 12.

Regarding claim 3: The retaining ring of claim 2, wherein the semi-circular cross-section has a diameter about equal to a width of the channel, see Fig 12.

Regarding claim 4: The retaining ring of claim 1, wherein the rounded ceiling has a flat Ceiling, see Fig. 11B.

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Regarding claim 5: The retaining ring of claim 4, wherein the rounded ceiling is rounded at an intersection of the flat portion and vertical side-walls of the channel, see Fig. 11B.

Regarding claim 6: The retaining ring of claim 1, wherein each channel includes substantially vertical side-walls, see Fig. 11B.

Regarding claim 7: The retaining ring of claim 1, wherein the plurality of channels have substantially uniform depth, see Fig. 15B.

Regarding claim 8: The retaining ring of claim 1, wherein the plurality of channels are oriented at an angle relative to a radial segment extending through the center of the retaining ring, see Fig 8.

Regarding claim 13: The retaining ring of claim 1, wherein the annular body comprises a wearable material, see page 7 lines 15-29.

Regarding claim 18: The retaining ring of claim 1, wherein the plurality of channel are distributed at substantially equal angular intervals around the retaining ring, see Figs. 15B.

Regarding claim 19: Kajiwara et al teaches a carrier head comprising:  
a substrate receiving surface (155),  
a generally annular retaining ring (170) surrounding the substrate receiving surface, the retaining ring having a top surface, a bottom surface, an inner diameter surface, and an outer diameter surface, wherein the bottom surface includes a plurality of channels (215), each channel extending from the inner diameter surface to the outer diameter surface and having a rounded ceiling.

Regarding claim 20: Kajiwara et al teaches a method of polishing, comprising:  
creating relative motion between a substrate and a polishing surface;  
restraining the substrate with retaining ring that has a top surface, a bottom surface, an inner diameter surface, and an outer diameter surface, wherein the bottom surface includes a plurality of channels, each channel extending from the inner diameter surface to the outer diameter surface and having a rounded ceiling, and  
supplying a polishing liquid to the polishing surface so that the polishing liquid flows through the channels and beneath the retaining ring to the substrate, see title, abstract, and Figs. 11B,12 and 15B of Kajiwara et al.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kajiwara et al.

The teachings of Kajiwara et al were discussed above.

Kajiwara et al fails to teach the retaining ring of claim 8, wherein the angle is between 300 and 600.

However, Kajiwara et al does teach on page 14 lines 7-22 that the actual location of the recesses is a matter of optimization so that the rebound effect for polishing pads is

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reduced over time. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide the recesses of Kajiwara et al at an angle range of 300 to 600 in order to accommodate the force caused by polishing.

5. Claims 10-12 and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kajiwara et al in view of DeMeyer et al.

The teachings of Kajiwara et al were discussed above.

Kajiwara et al fails to teach that the retaining ring of claim 1, wherein the outer diameter surface includes a ledge.

DeMeyers et al teaches a two retaining ring wherein the outer diameter surface includes a ledge, See Fig 1A. and [0023-0026]. The motivation to provide a ledge is that the design ensures a threaded edge surface and an enhanced assembly surface for the CMP apparatus. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a ledge in the retaining ring of Kajiwara et al when modified by the teachings of DeMeyer et al.

Regarding claim 11: The retaining ring of claim 10, wherein the outer diameter surface includes a first portion adjacent the bottom surface that has an outer diameter less than a second portion adjacent the top surface. This occurs due to the ledge of DeMeyer et al.

Regarding claim 12: Recall the retaining ring of Kajiwara et al teaches that each channel includes substantially vertical side-walls see Fig. 11, 12, and 15B. The modification of Kajiwara et al including the ledge of DeMeyers would deem obvious that the side walls extend to substantially the same depth as the ledge.

Additionally, Kajiwara et al fails to teach:

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Regarding claim 14: The retaining ring of claim 1, wherein the annular body comprises an upper portion and a lower portion, the upper portion being more rigid than the lower portion. DeMeyer et al teaches a two-part retaining ring wherein the upper part is metal and the lower part is made of plastic. The motivation to modify the apparatus of Kajiwara et al into a two piece construction is that the wearable plastic portion of the ring can be replaced without removing the top portion from the carrier head see [007] of DeMeyer et al.

Regarding claim 15: The retaining ring of claim 14, recall the channels of Kajiwara et al are formed in the lower portion.

Regarding claim 16: The retaining ring of claim 15, wherein the lower portion is formed of a wearable material. Note the lower portion of DeMeyer et al is a wearable plastic.

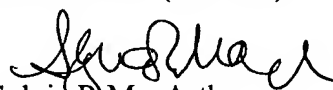
Regarding claim 17: The retaining ring of claim 15, further comprising a plurality of passages extending through the upper portion from the inner diameter surface to the outer diameter, see the channels of Kajiwara et al .

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-F during the core hours of 9 a.m. and 3 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Sylvia R. MacArthur  
Patent Examiner  
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November 14, 2005